

**IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION**

GENERAL ELECTRIC
COMPANY,

Plaintiff,

v.

mitsubishi heavy industries,
ltd., and mitsubishi power
systems americas, inc.,

Defendants.

Civil Action No. 3:10-CV-276-F

**DEFENDANTS' POST-TRIAL REPLY BRIEF
REGARDING INEQUITABLE CONDUCT**

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PRELIMINARY STATEMENT

The doctrine of inequitable conduct remains vibrant after *Therasense*. On remand from the Federal Circuit's decision in that case, the district court again found that the standards for inequitable conduct were satisfied. *See Therasense, Inc. v. Becton, Dickinson and Co.*, 864 F. Supp. 2d 856, 858 (N.D. Cal. 2012). Less than a month later, the Federal Circuit affirmed another district court finding of inequitable conduct. *See Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1328 (Fed. Cir. 2012). Courts continue to invoke the doctrine of inequitable conduct because it plays a critical role in assuring that applicants fulfill their duty of candor to the PTO. Absent the doctrine, applicants have little incentive to make full disclosure. Absent full disclosure, the PTO does not have the resources to analyze *ex parte* applications, and bad patents issue. GE does not dispute these underpinnings of the inequitable conduct doctrine.

This is the paradigm case to invoke that doctrine. Mitsubishi's opening brief showed that the prior art was material, that the five key GE players knew about it, and that their failure to disclose multiple pieces of prior art, over a period of time, as part of a pattern of nondisclosure, evidenced an intent to deceive the PTO. GE's opposition brief fails to rebut this case.

GE admits, "The materiality required to establish inequitable conduct is but for materiality. Prior art is but for material if the PTO would not have allowed a claim had it been aware of the undisclosed prior art." GE Br. 11 (quoting *Therasense*). Here, there is authoritative proof that the PTO would not have allowed the patent: The PTO, made aware of the undisclosed art, has refused to allow the key claims of the patent. *See DTX 2785 at 3, 10-11, 17-19 (App. 1245, 1252-53, 1259-61).*

In fact, in a December 18, 2012 decision rendered *after* Mitsubishi's opening brief, the PTO issued *another* rejection of key claims of the '705 patent, this time rejecting claim 1 based on the Nielsen patent. *See* Office Action in *Ex Parte* Reexamination, dated December 18, 2012, at page 4-5 (Supp. App. 181-82).¹ The PTO endorsed exactly the rationale advanced by Mitsubishi in this Court – that the connection to the grid through the rotor was sufficient – and also accepted Mitsubishi's arguments that other embodiments in Nielsen contemplated the connection of the stator during a zero voltage fault. *Id.* Thus, the PTO has rejected at least claims 1 and 7 of the '705 patent based on three separate pieces of prior art (Erdman, Wobben, and Nielsen). There could be no more compelling proof of materiality.

GE asks this Court to “independently” decide the materiality issue. (GE Br. 4). In effect, GE seeks to have this Court tell the PTO what the PTO would find material, when the PTO has already made that determination for itself. GE does not cite a single case that authorizes that approach. In the wake of a *Therasense* decision tying the materiality determination very tightly to what the PTO would do, GE invites the Court to ignore what the PTO has done.

Even viewing the issue *de novo*, however, the prior art omitted by GE was clearly material. Each of the pieces of prior art, on its face, deals with a zero volt fault. *See* Erdman at [0035] (“[E]ven if voltage is zero at a fault”) (App. 635); Wobben at 9:16-17

¹ “Supp. App.” references are to the Supplemental Appendix being filed contemporaneously with this reply brief. “App.” references are to the Appendix filed with Mitsubishi's post-trial brief. (Dkt. 745). The PTO's December 18, 2012 Office Action – cited both here and in GE's post-trial brief (GE Br. 10) – was issued after the conclusion of the bench trial and thus could not have been admitted earlier. Mitsubishi has asked GE's counsel if GE would agree to the inclusion of the PTO's December 18 Office Action in the record as part of the '705 prosecution history. GE has not responded but, once it does, Mitsubishi will notify the Court as to the parties' position.

(a “symmetrical 3-phase fault F with zero impedance”) (App. 658); Nielsen at 2:5-8 (“fault conditions, such as low voltages or zero voltages on the power grid. . .”) (App. 733); Bolik at 5 (“The turbine will always be connected to the grid, even at 0 voltage for 200 ms”) (App. 706). As a matter of recently reaffirmed law – not disputed by GE – these references are presumed to be enabling (i.e., to deliver what they promise). *See In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012).

In order to avoid this abundant prior art, GE now advances a very narrow view of the '705 patent. GE argues that “the invention is keeping the entire electrical machine connected when the turbine sees zero volts.” (GE Br. 2). But GE does not show that this definition derives from the actual language of the '705 patent. For example, the patent does not mention the “entire” electrical machine. The claims have no requirement about what the turbine “sees.” Nor do they provide that the fault must occur “at the turbine.”

Perhaps most central, the patent does not state that the voltage must be zero at the point at which the turbine measures. In fact, the patent’s specification specifically discloses embodiments in which measurement will occur *within the turbine*. *See* DTX 1509 at 4:36-40 (App. 881). This is critical, because every one of the witnesses at trial agreed that, due to impedances, there will be some voltage inside the turbine even when there is a fault outside the turbine. *See* Vol. 6B Tr. 20:16-21:5 (Grady) (Supp. App. 46-47); Vol. 4 Tr. 50:16-18 (Larsen) (Supp. App. 34); Vol. 1B Tr. 122:1-6 (Harley) (App. 51). In fact, GE’s own test results, presented by GE in an exhibit used at both trials, confirm this point. The tests of GE’s 1.5 MW turbine confirmed that during the same period when the medium voltage (outside the turbine) dropped to zero volts, the low

voltage lines (within the turbine) showed a voltage above 5%. *See* PTX 6 at 152, 154 (Supp. App. 205, 207).

GE faults Mitsubishi for not citing the '705 patent. (GE Br. 3). This is not true – there are references to the '705 patent throughout Mitsubishi's brief.² But what is remarkable is that GE, after making that accusation, completely fails to anchor any of its interpretations in the language of the '705 patent.

- GE does not cite any language in the claims of the patent that determines where the fault occurs;
- GE does not cite any language in the claims that determines where the voltage is measured and simply ignores the language in the specification offering multiple locations;
- GE does not identify any language in the patent stating that the stator should remain connected; and
- GE does not identify any language in the patent saying that a PLL state machine must have four states, and GE ignores the explicit language in the specification patent saying that it can have any number of states.

The patent does not have the limitations that GE seeks to import. At best, GE is using examples in the specification to create limitations in the claims – a practice that the Federal Circuit has condemned. *See Falana v. Kent State Univ.*, 669 F.3d 1349, 1355 (Fed. Cir. 2012) (“It is the *claims*, not the written description, which define the scope of the patent right.”) (internal citations omitted).

In reality, GE is manufacturing limitations on its patent that would lead to a different result on infringement. To take one example, GE claims that Erdman is inapposite because he would measure inside the turbine and there find 5% or more in

² For example, on page 31, Mitsubishi argues that the patent refers only to zero voltage on the “electric power system” and does not specify any specific location where the fault must occur. On page 72, it quotes the language of the specification for the point that a PLL state machine includes any number of states that facilitates operation of a wind turbine during a grid disturbance.

voltage. (GE Br. 24-26). Yet an exhibit cited by GE shows that Mitsubishi also measures inside the turbine, where similar voltage would be found. *See* PTX 68 at 20, 29, 74 (Supp. App. 227, 236, 281). If Erdman is not material prior art, then Mitsubishi's technology is not infringing.

GE has effectively walked away from its position in the infringement trial. There, GE presented its '705 patent as the solution to FERC's Order 661A, an order that required zero volts on the high side of the wind plant step up transformer, not the base of the turbine. *See* Mar. 1, 2012 AM Tr. 47:6-48:13 (Supp. App. 430-431). There, GE showed that it practiced the '705 patent by presenting the jury with a marketing document in which GE claimed that its 1.5 MW turbines could deliver "0% voltage for 200 msec at the *point of interconnection* for single- and three-phase faults." *See* PTX 24.00005 (App. 1357). There, GE presented an exhibit that showed Mitsubishi measuring voltage within the turbine, just as in the Erdman patent. *See* PTX 68 at 20 (Supp. App. 227) (indicating measurement on the 690V line). At no time during that jury trial did GE state that its patent was limited to faults at the base of the turbine. At no time did GE say that measurement of voltage must take place at the fault. In a brief full of quotes, GE has not a single quotation from the first trial articulating these limitations to its patent. GE cannot rely on a dramatic narrowing of its patent, not rooted in its language, to escape the materiality of the prior art.

Nor has GE shown that its key players were unaware of this prior art. Mitsubishi's post-trial brief demonstrated that industry grid codes began requiring ride through of zero faults as early as 2003, that GE's principal rivals had the technical capability to satisfy these codes, and that the five key GE players knew it. GE has not

even attempted to make a showing to the contrary. Similarly, Mitsubishi showed at trial and in its initial brief that GE had several different squads of engineers monitoring and analyzing the competitor art, and that reports on the technical developments in the interconnection area went directly to the same people involved with the '705 patent – the Grid Interconnection IP Team comprised of key GE players. Again, GE does not even disagree with this evidence.

Instead, GE claims that the *purpose* for which its engineers and lawyers analyzed the competitor art was different: to determine whether GE technology infringed on the patents of its competitors. This is not a valid distinction. In effect, GE claims that applicants for a patent can compartmentalize their knowledge. If they analyze the relationship between prior art and their own technology for purposes of infringement, they can ignore that knowledge in submitting their patent application. No court has ever so held. Such a holding would be plainly inconsistent with the duty of candor.

GE also relies on testimony from Jim McGinness in which he states that no one on any of his various technical teams brought to his attention the relationship of the prior art to the '705 patent application. GE Br. 45 (quoting Vol. 3B Tr. 22:2-8). Again, his statement does not deny that his technical advisors may have brought his attention to the prior art for other purposes. Indeed, there is abundant evidence that they sent him the Erdman, Wobben, and Nielsen patents on multiple occasions. McGinness nevertheless claims that the analyses that he received concerning the prior art did not call attention to its materiality to GE's own application.

This is patently unfair. GE is relying on its lawyer's characterization of the communications, while withholding the documents themselves. Mitsubishi has not

received a single document containing the advice that the technical teams provided to McGinness, while GE has relied on his assertions about the content of that advice. Mitsubishi is entitled either to see the underlying correspondence or to secure an inference that the undisclosed correspondence did point out the relationship between these patents and GE's own pending patent application.

Similarly, McGinness claims that he instructed his lawyers to disclose only the Janssen application, because that was the only one of which he was aware. Vol. 3B Tr. 21:25-22:8 (App. 201-02). First, the assertion is clearly inconsistent with the evidence: as noted, McGinness was plainly aware of all three competitor patents on which the PTO has found the relevant claims unpatentable. Second, this assertion can be examined only through the communications that McGinness received from his technical team and that he engaged in with his lawyers. GE has withheld all of those materials.

Despite these limits, Mitsubishi has presented compelling evidence that the five key GE players deliberately concealed material prior art and public uses. GE criticizes Mitsubishi as "lacking any direct evidence" (GE Br. 46), but there is no such requirement. *Therasense* reaffirms that direct evidence is rare and that circumstantial evidence is the ordinary means of proving intent. *See Therasense, Inc. v. Becton, Dickinson and Co.*, 649 F.3d 1276, 1290 (Fed. Cir. 2011) (en banc) ("Because direct evidence of deceptive intent is rare, a district court may infer intent from indirect and circumstantial evidence."). Here, Mitsubishi pointed to several kinds of circumstantial evidence: the unprecedented number of omitted references, the disclosure of an older reference at 15% voltage when newer references based on zero volts were omitted, the

failure to correct the omissions over a period of three years, the prior failure to attribute the E.ON curve, and the lack of any credible explanation.

GE's response is to deny the premise. GE does not deny that courts have found each of these factors to be pertinent in analyzing intent to deceive, but argues that there is no factual predicate. For example, GE says that the number of alleged missing references is "extravagant." (GE Br. 46). But there is nothing extravagant about it. The PTO actually found that GE had omitted seven prior references: Erdman, Wobben, Nielsen, Pate, Kaura, Milasi, and Wall. *See* DTX 2785 (App. 1243-90). Mitsubishi has been conservative in focusing on only three patents, their related publications, and the public uses that were not presented to the PTO. Nevertheless, the evidence is overwhelming that the industry had developed zero voltage ride through long before the '705 patent. The five key GE players concealed the state of the industry, not just a prior reference. They did it for many years. That is inequitable conduct.

ARGUMENT

I. The Withheld Prior Art Was Material

A. The PTO Has Already Answered the Materiality Question

In the post-*Therasense* world, an undisclosed reference is material if "the PTO would not have allowed a claim had it been aware of the undisclosed prior art." *Therasense*, 649 F.3d at 1291. Here, the PTO has already stated, repeatedly and unequivocally, that it would not have allowed Claims 1 and 7 of the '705 patent to issue if it had known about any of Erdman, Wobben, or Nielsen.

The PTO's Action Closing Prosecution (ACP), issued by a panel of *three* examiners on September 25, 2012, is the best evidence of what the PTO would have done had it been presented with the undisclosed references during the pendency of the '705

application. In that office action, the PTO said that Erdman “remain[s] connected to the grid during a voltage fault, which includes an approximately zero voltage event,” and rejected Claims 1 and 7 as anticipating. DTX 2785 at 11 (App. 1253). The PTO also ruled that Wobben anticipated Claims 1 and 7, and incorporated Mitsubishi’s grounds for rejection “as proposed.” *Id.* at 18 (App. 1260). In addition, the PTO ruled that Claim 7 was unpatentable in view of Nielsen. *Id.* at 19 (App. 1261). The patentability of Claim 1 based on Nielsen was not ripe for decision at the time.

On December 18, 2012, the PTO reexamined the patentability of Claim 1 in view of Nielsen. Examiner Nasser stated that “it seems clear that at least a portion of the electrical machine remains connected to the grid for voltages on the grid that are very low are [sic] even zero.” Office Action in *Ex Parte* Reexamination dated December 18, 2012, at 5 (Supp. App. 182). Based on that finding, the office concluded that Nielsen represented another independent basis for rejection of Claim 1. *Id.* at 4-5.

There is no better evidence of what the PTO would have done than what the PTO *has done*. In *Presidio Components, Inc. v. American Technical Ceramics Corp.*, 723 F. Supp. 2d 1284, 1314 (S.D. Cal. 2010), a district court held that a PTO decision granting reexamination in view of previously-undisclosed art was “surely probative of materiality.” Here, the PTO has gone much further. It has not only granted reexamination in view of Erdman, Wobben, and other references, but it has *rejected* Claims 1 and 7 of the '705 patent based on the same references. Further, the PTO has found that Erdman, Wobben, and Nielsen each *independently* require rejection of Claims 1 and 7. This is unprecedented evidence that the PTO would have disallowed the claims if the references had been timely disclosed.

GE has not identified a shred of evidence suggesting that the PTO would have allowed Claim 1 and 7 had Erdman, Wobben, or Nielsen been disclosed. Nor has GE cited a single case in which a court has found undisclosed prior art immaterial where, as here, it formed the basis for the PTO's rejection of claims on reexamination.

GE submits that the PTO's rejections of Claims 1 and 7 should not be credited because they are subject to further review. (GE Br. 4). However, Claims 1 and 7 were preliminarily rejected by a single examiner in view of Erdman and Wobben and then rejected *again* by a panel of three examiners in view of the same references. And the PTO has recently added a rejection of Claim 1 based on Nielsen. Speculation about possible appeals cannot overcome a history of actual decisions.

The Federal Circuit in *Therasense* was adamant that, in determining materiality for purposes of inequitable conduct, the district court must determine "whether the PTO would have allowed the claim if it had been aware of the undisclosed reference." 649 F.3d at 1291. The Circuit even noted that, in situations where the district court would not itself invalidate the claim under its own standard of proof, it should find the prior reference material "if it would have blocked patent issuance under the PTO's different evidentiary standards." *Id.* at 1292. Given the actions of the PTO in this case, there is no question that the Erdman, Wobben, and Nielsen references are material.

B. GE's Brief Rests on a Fundamental Misunderstanding of Claim Construction Principles

The rulings of the PTO rest on the broad language of the patent claims. Claims 1 and 7 say that the "electrical machine" must remain connected to the "electric power system" when the "voltage amplitude" of the "electric power system" decreases below a predetermined range, including "approximately zero volts." DTX 1509 at 11:60-67

(App. 885). The parties agree that the “electric power system” is the grid. *See* March 1, 2012, Vol. 3A Tr. at 71:20-21 (Grady) (Supp. App. 435). The claims do not say the point on the grid where the voltage must reach “approximately zero volts” or where voltage is to be measured. Similarly, claims 9 and 13 require a “PLL state machine” without stating how many states or which states must be included. DTX 1509 at 13:24-42, 14:24-44 (App. 886).

Faced with action by the PTO resting on this broad language, GE has, *post hoc*, sought to narrow the scope of its patent to evade material prior art that the PTO has found invalidating. But GE’s new narrow interpretation of the '705 patent runs afoul of hornbook rules of claim construction.

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled to the right to exclude.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). The words of a claim must be given their plain or ordinary meaning unless the patentee either (1) acts as his own lexicographer and sets out specific definitions for claim terms in the specification; or (2) expressly disavows the full scope of a claim term in either the specification or during prosecution. *See Toshiba Corp. v. Imation Corp.*, 681 F.3d 1358, 1369 (Fed. Cir. 2012). “To act as its own lexicographer, a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning.” *Thorner v. Sony Computer Entm’t America LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). The standard for disavowal of claim scope is “similarly exacting.” *Id.* at 1366. Unless the patentee’s intent to deviate from the ordinary meaning of a claim term is “manifest” on the face of the specification, the claim language will be given its full scope. *Id.*

GE contends that it is “abundantly clear” that the invention of the '705 patent is “keeping the entire electrical machine connected when the turbine sees zero volts.” (GE Br. 2). But, as noted above, GE cannot anchor any aspect of that assertion in the plain language of the claims, which define the scope of the invention. *Phillips*, 415 F.3d at 1312; *Toshiba*, 681 F.3d at 1369. In particular, GE does not point to any language in the claims to support its view (1) that the fault must take place at the foot of the turbine; (2) that voltage must be measured at the location of the fault; or (3) that the *entire* electrical machine must remain connected throughout the fault.

Rather than point to limiting language in the claims to support its new narrow view of the '705 patent, GE relies heavily on the patent specification. (GE Br. 15). In this respect, GE makes a fundamental error in claim interpretation. The Federal Circuit has repeatedly cautioned that “[i]t is the claims, not the written description, which define the scope of the patent right,” and that the claimed invention is not limited to “preferred embodiments or specific examples in the specification.” *Falana v. Kent State Univ.*, 669 F.3d 1349, 1355 (Fed. Cir. 2012); *see also Thorner*, 669 F.3d at 1366 (“We do not read limitations from the specification into claims; we do not redefine words.”); *Superguide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (“[A] particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.”); *Laitram Corp. v. NEC Corp.*, 163 F.3d 1342, 1348 (“[A] court may not import limitations from the written description into the claims.”); *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 987 (Fed. Cir. 1988) (“Where a specification does not *require* a limitation, that limitation should not be read from the specification into the claims.”) (emphasis added). With each of GE’s proposed

claim constructions, GE defies this basic precept – that *claims*, and not specifications, control a patent’s preemptive scope.

1. GE Errs in Asserting the Patent is Limited to Ride Through of Faults at the Base of the Turbine

GE’s first narrowing step is to assume that the patent covers only a fault at the base of the turbine, or on the high voltage-side of the padmount transformer. There is no such requirement in the claims, which refer only to the voltage amplitude of the *electric power system* decreasing below the predetermined range including approximately zero volts. DTX 1509 at 11:62-66 (App. 885) (emphasis added). Certainly, under the broadest reasonable construction, this term is broad enough to encompass the point of interconnection between a wind farm and the grid on the high side of the substation transformer. (Vol. 1B Tr. 95:12-23) (Supp. App. 4).

Referring to the specification, however, GE insists that the '705 patent requires the fault to be at point 242 on Figure 2, the high-side of the padmount transformer: “[T]he specification explicitly states that the electrical machine remains connected during an subsequent to the grid voltage dropping to zero volts at point 242 shown in Figure 2.” (GE Br. 15). GE points to language in the specification stating, “In the *exemplary embodiment*, each of three voltage transducers 252 are electrically coupled to each of the three phases of bus 242.” DTX 1509 at 4:34-36 (App. 881) (emphasis added). GE also points to a description of Figure 3 in the specification. (GE Br. 15) (quoting DTX 1509 at 6:24-26) (“A grid line voltage of 0% is indicative of zero voltage on bus 242.”).

In this reliance on examples from the specification to create limitations to the claims, GE invites an elementary interpretive error. The claims themselves do not contain any language limiting the location of the fault to point 242. And, the

specification does not define “electric power system” in any way that could be construed to disavow the ordinary meaning of the term or to supply a limitation of its own. *See Falana*, 669 F.3d at 1355; *Specialty Composites*, 845 F.2d at 987. Rather, the language of the specification makes clear that it is just describing one embodiment and not setting a requirement. *See* DTX 1509 2:42-44 (App. 880) (“Fig. 2 is a schematic view of an exemplary electrical and control system that may be used with wind turbine generator (shown in Fig. 1).”); *id.* at 6:19-21 (App. 882) (“Fig. 3 is a graphical view of grid line voltage versus time that may be associated with electrical and control system 200 (shown in Fig. 2).”). The specification does not limit the claims.

In addition, GE’s construction ignores objective guides to interpretation that would almost invariably have been considered by a person of ordinary skill in the art interpreting the claims. Grid codes worldwide almost unanimously required riding through faults at the point where the wind farm connects to the grid. *See* Mitsubishi Br. at 32 (citing numerous international ride-through standards). A person of ordinary skill would have interpreted the '705 patent in light of these standards and would have understood it to be addressed to faults at that interconnection point.

In its brief, GE objects to Mitsubishi’s use of grid codes to interpret the meaning of the '705 patent. (GE Br. 18). But GE’s own expert relies on precisely the same type of evidence for the same purpose. In the first trial, he presented the '705 patent as providing “a solution for the zero voltage ride through problem” posed by FERC Order 661A. (March 1, 2012 A.M. Tr. at 47:10-48:17, 50:3-12, 51:8-11) (Supp. App. 430-431, 433-434). In the second trial, he explicitly relied on FERC Order 661A “for the point, you know, to consider for zero voltage.” (Vol. 6A Tr. 74:1-2) (Supp. App. 41.1).

The only difference between Mitsubishi's and GE's use of the FERC Order is that Dr. Grady was mistaken as to its exact meaning. Dr. Grady testified that FERC 661A is addressed to faults at the "high side of the . . . generator step unit," and that this means the "pad-mounted transformer at the wind turbine." (Vol. 6A Tr. 76:17-77:1) (Supp. App. 42-43). But, as already explained in Mitsubishi's opening brief (at 19), FERC 661A applies to faults at the high voltage side of the *wind farm substation* transformer. *See also* Dkt. 734 at 7 (citing FERC Order 661A at App. G). GE has made no effort to rebut Mitsubishi's detailed showing on that point. *Compare* Mitsubishi Br. 19, *with* GE Br. 18. FERC 661A, like the E.ON 2003 Standard and other grid codes referred to during trial, suggests that the '705 patent was addressed to faults at the point where the wind farm connects to the utility grid. Thus, applying the broadest reasonable construction in light of the claims of the '705 patent, the specification, and relevant extrinsic evidence, "electric power system" is certainly broad enough to encompass faults at the point at which the wind farm connects with the utility grid.

In fact, as Mitsubishi pointed out in its initial brief, when it came time for GE to demonstrate to the jury and the Court that it practiced its invention in the first trial, it referred to an October 3, 2006 GE document that quite explicitly touted the ability of GE's 1.5 MW turbines to deliver "0% voltage for 200 msec *at the point of interconnection* for single- and three-phase faults." Mitsubishi Br. at 33 (quoting PTX 24 from first trial) (emphasis added). GE never responded to this point in its opposition brief. Based on erroneous use of the specification, GE is asking this Court to interpret the patent so narrowly that it would place GE's own commercial technology outside of its patent.

2. GE Adopts an Unreasonably Narrow Interpretation of the Point of Measurement

Next, GE makes the artificial limiting assumption that voltage must be measured at the location of the fault on the high-side of the padmount transformer. According to GE, “zero volts in the claims clearly refers to zero volts at the electrical machine” because “Figure 2 of the '705 patent . . . shows the control system 202 measures the grid voltage at point 242.” (GE Br. 15). But, once again, neither the claims nor the specification supports GE’s proposed limitation.

As an initial matter, there is no language in the claims requiring voltage measurement to be performed at bus 242. *See* Vol. 1B 98:20-23 (App. 40) (Harley) (“[Claims 1 and 7] do not say anything about where the voltage should be measured.”). Even more compelling, the very specification that GE relies on for the proposition that measurement must occur at point 242 on Figure 2 provides for *additional* possible points of measurement, including point 216 inside the turbine and anywhere within zone 200. *See* DTX 1509 at 4:36-40 (App. 881) (“Alternatively, voltage transducers 252 are electrically coupled to system bus 216. Also, alternatively, voltage transducers 252 are electrically coupled to any portion of system 200 as described herein.”); *see also* Vol. 4 Tr. 50:2-13 (Supp. App. 34) (Larsen admits that the measurement of voltage could be taken “anywhere basically within that Zone 200”); Vol. 6B Tr. 24:11-25:5 (Supp. App. 50-51) (Grady). It is only in what the specification calls the “exemplary embodiment” that voltage is measured at point 242. It is hornbook law that claims are not limited to only one embodiment, not even the preferred embodiment. *See King Pharmaceuticals Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1275 (Fed. Cir. 2010).

Assuming that measurement takes place within the turbine at point 216, *as the specification expressly allows*, every single witness testifying on the subject agreed that the turbine would detect voltage, rather than “see zero volts,” during a zero fault:

Grady:

Q. And my question to you, sir, is we have that zero voltage at 242, and we have a measuring device at 216. We’re going to get some impedance picked up by that measuring device through that pad mount transformer 234, right?

A. There is a little bit of impedance between the two.

Q. Okay. And that’s going to result in the measuring device seeing voltage, right?

A. Well, now we’re talking about how much voltage.

Q. It will see some voltage?

A. Well, it’s going to be less than 5 percent. The transformer impedance is 5 percent. So it’s a rare condition that you would ever see 5 percent.

Q. It would see some voltage, correct?

A. Tiny difference. (Vol. 6B Tr. 23:9-24) (Supp. App. 49).

Larsen:

A. Well, if there is a fault at 242, you would see something at 216. And if there is a fault at 216, you would see something at 242. (Vol. 4 Tr. 50:16-18) (Supp. App. 34).

Harley:

A. If the voltage is zero on the right-hand side of the padmount transformer, I would expect to find 5, 6, 7 percent on the other side of the transformer. (Vol. 1B 122:1-6) (App. 51).

See also Lyons, Vol. 6A Tr. 24:2-15, 26:17-27:4 (Supp. App. 37, 39-40) (explaining that 10 to 15% voltage would be reflected back to the inside of the turbine from a fault beyond two transformers). As Dr. Grady explained, impedances between the measurement point inside the turbine and the fault location ensure that there will be

residual voltage at the place of measurement even when the voltage at the fault drops all the way to zero. (Vol. 6B Tr. 23:9-24) (Supp. App. 49).

Stunningly, GE holds steadfastly to its contention that the '705 patent requires seeing zero volts despite evidence that *GE's own turbines measured voltage inside the turbine during ZVRT certification tests*. In both phases of trial, GE introduced PTX 6, the August 2007 WindTest report certifying GE's 1.5 MW turbine. It reported on tests of both low voltage (690V, inside the turbine) and medium voltage (10kv, after the pad mount transformer). See PTX006.00018, PTX006.00152, PTX006.00154 (Supp. App. 204, 205, 207). Figures 3.26.1 and 3.26.2 from PTX 6 tell the remarkable story:

3.26.1 Graph of current, voltage and power at the low voltage level

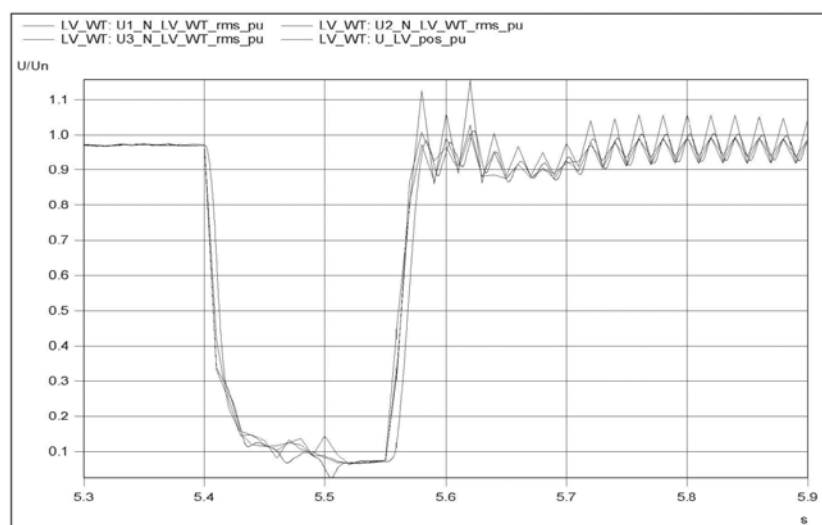
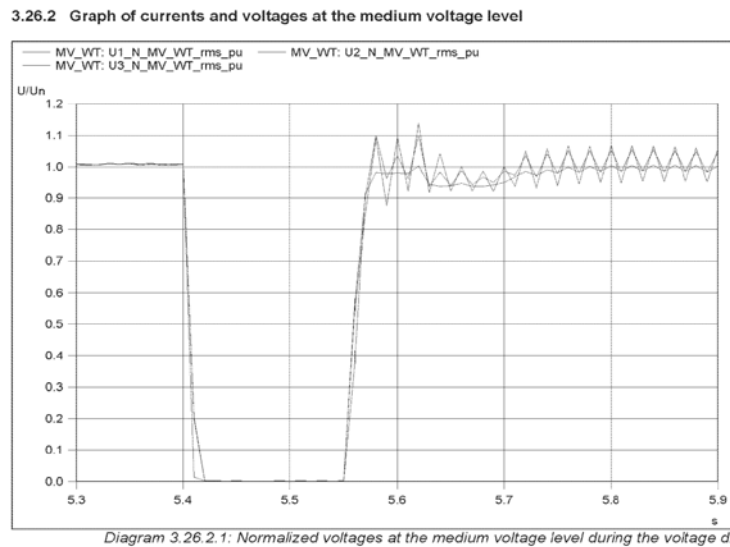


Diagram 3.26.1.1: Normalized voltages at the low voltage level during the voltage dip

(PTX006.00152) (Supp. App. 205). Figure 3.26.1, above, shows the voltage recorded on the low voltage level—i.e., inside the GE 1.5 MW turbine— during a zero voltage fault lasting for 150 ms. (*Id.*). During the fault – beginning at approximately 5.42 seconds and lasting until approximately 5.57 seconds – the measured voltage at the low voltage level is at least .05, or 5%, **not zero**. (*Id.*). Figure 3.26.2, meanwhile, shows the voltage at the

medium voltage level – i.e., on the high-side of the padmount transformer – during the same interval:



(PTX006.00154) (Supp. App. 207). As one would expect, the voltage at medium voltage level – i.e., the location of the fault – drops all the way to zero. (*Id.*). The significance of these results cannot be understated. They show that GE’s own turbine – precisely like Erdman and Wobben – detects 5 or 6% voltage during a zero voltage event.

Thus, GE’s own certification document clarifies a key point: Even if there is zero voltage on the high side of the padmount transformer, the converter will be sensing some voltage within the turbine. GE cannot locate a single phrase in the claims or the specification that requires the turbine to be “blind.” The subjective statements of inventors regarding their intent have “little or no probative weight in determining the scope of a claim.” *Howmedica Osteonics Corp. v. Wright Medical Technology, Inc.*, 540 F.3d 1337, 1346 (Fed. Cir. 2008). Not surprisingly, the PTO has already squarely rejected this thesis. *See* DTX 2785 at 9 (App. 1251) (“The examiner agrees with 3PR

that the condition of blindness is not required by the claims, especially considering the use of ‘approximately zero volts’ as discussed above.”).

In sum, GE’s notion that the '705 patent is limited to situations in which the turbine sees zero volts is a completely untenable one, contradicted by the plain language of the claims, the specification, and other contemporaneous evidence.

3. GE Errs in Construing the Patent to Require that the Entire Electrical Machine Must Remain Connected

In an attempt to avoid the impact of Nielsen, GE insists that the claims also require “that the *entire* electrical machine remain connected during and subsequent to the zero-voltage event.” (GE Br. 22) (emphasis added). Again, the claims say nothing about the *entire* electrical machine remaining connected. *See* DTX 1509 at 11:60-65 (App. 885).

According to GE, a requirement that the entire electrical machine, including the stator, remain connected would be in keeping with the specification. (GE Br. 23). But the specification merely describes the electrical machine as consisting of a stator and a rotor; it does not say anything about what parts of the electrical machine must remain connected during the fault, and such a limitation should not be inferred. *See Falana*, 669 F.3d at 1355. GE even suggests that Professor Harley has confirmed that the claims of the '705 patent require the stator to remain connected. (GE Br. 23). But GE’s assertion distorts what Professor Harley actually said. Asked whether the stator remains electrically connected to the grid according to the claims of the '705 patent, Professor Harley clarified that the “*electrical machine* remains connected.” (Vol. 2A Tr. 105:19-106:1) (Supp. App. 10-11) (emphasis added). Dr. Harley also fairly answered the question that the patent says nothing about disconnecting the stator. *Id.* But the converse is similarly true: the patent says nothing about the stator remaining connected. Thus, GE

is seeking to narrow the scope of the patent when no language in either the claims or the specification requires this limitation.

Applying the broadest reasonable construction, Claims 1 and 7 require that some portion of the electrical machine must remain connected during and subsequent to a zero voltage event. Not surprisingly, this is the construction that has been adopted by the PTO. *See* Office Action in *Ex Parte* Reexamination, dated December 18, 2012, at 5 (Supp. App. 182) (reasoning that Nielsen anticipates Claim 1 because “it seems clear that at least a portion of the electrical machine remains connected to the grid for voltages on the grid that are very low are [sic] even zero”).

C. The Undisclosed References are Material

GE’s claim constructions are wrong, but they are also non-dispositive. Even viewing the patent as one limited to riding through zero voltage events on the high-side of the padmount transformer, the Erdman and Wobben references are material because they permit a wind turbine to ride through a fault at that location. And even if it were accepted that the stator must remain connected, the Nielsen, Bolik, and Saylor references are material because they disclose precisely that.

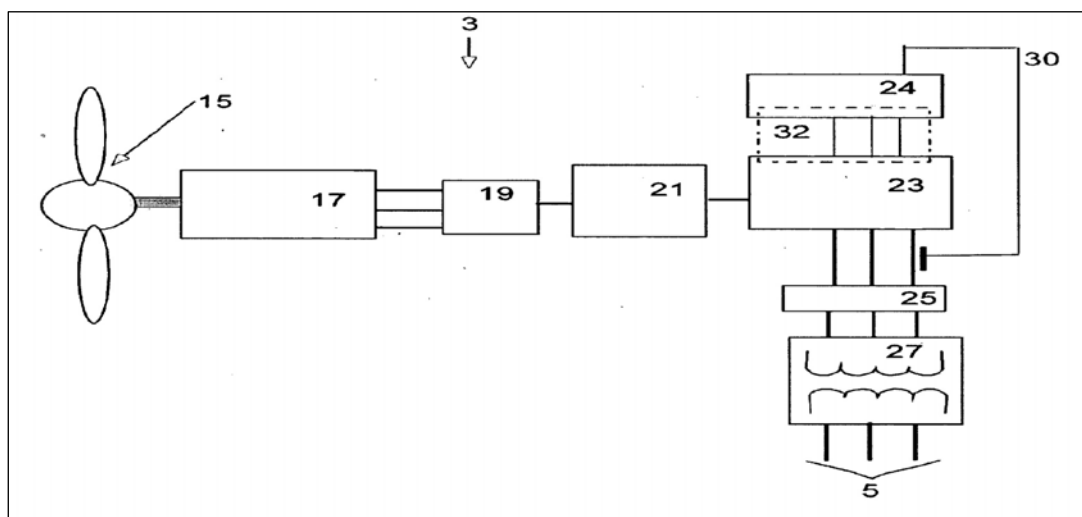
1. Erdman

GE claims that Erdman “discloses low, but not zero voltage ride through.” (GE Br. 24). But the plain language of the Erdman patent tells a starkly different story:

[E]ven if voltage is *zero* at a fault point at a distant location on the utility collection, distribution, sub-transmission, or transmission system, impedance between the generator and the fault will still create a voltage waveform as long as current is supplied.

(DTX 1199 at [0035]) (App. 635) (emphasis added). Paragraph [0030] of Erdman explains what is meant by the “collection system,” also known as the “wind farm

collection system” – “Individual wind turbines are connected to a wind farm from collection system” and that system, in turn, “may interface with a utility grid distribution, sub-transmission, or transmission system via a substation transformer.” (Paragraph [0030]) (App. 634); *see also* Paragraph [0047]. Thus, the collection system consists of the wiring or cabling inside the wind farm. On Figure 2, a detailed diagram of the Erdman turbine reproduced below, the utility collection system is represented by the number 5 and the padmount transformer by the number 27. (*Id.* at [0031], [0033]) (App. 634). As the diagram shows at the bottom right, the utility collection system (5) is just outside the turbine on the high-side of the padmount transformer (27):



(*Id.* at Fig. 2) (App. 629). Thus, by its express terms, which must be presumed enabling, *see In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012), Erdman discloses riding through a zero voltage fault at the high-side of the padmount transformer.

In its brief and at trial, GE did not deal with the express language of Erdman. Instead, it played word games. It tried to suggest that Erdman would not work during a zero voltage event because it requires 5% voltage “at the turbine.” (GE Br. 25). But “at

the turbine” is an intentionally ambiguous phrase, and GE was trying to exploit that ambiguity despite clear language elsewhere in Erdman clearing up any ambiguity. Erdman is unequivocal that, due to impedances, there will be 5% voltage *inside* the turbine during a zero voltage fault outside. *See* DTX 1199 at [0017] (App. 633) (“Ground faults on the single senses phase, at the transmission or collection system level will typically produce more than 5% voltage given typical wind farm system impedances.”). Professor Harley explained, repeatedly, that the 5% voltage described in Erdman refers to voltage inside the turbine and does not mean that ZVRT is not occurring:

Q. Now, the fact that he says there’s going to be voltage at the generator, does that change your opinion as to whether there shows zero voltage ride through?

A. No, it does not.

Q. Why not?

A. Because he’s measuring voltage here at the generator as we have shown inside the tower. This is not a voltage that he’s measuring at the point of the fault, and we should not confuse the two.

...

A. Erdman clearly says, where the fault occurs, it can be zero, but where he measures, he requires approximately 5 percent. So the 5 percent does not relate to the point where the fault is occurring.

(Vol. 1B Tr. 111:9-20, 112:7-10) (Supp. App. 5-6).³ Grady admitted that Erdman takes its measurement inside the turbine, but would not go further. (Vol. 6B Tr. 27:18-22) (Supp. App. 53).

³ On the afternoon of the second day of trial, Professor Harley was asked, “Erdman will not work unless the controller at the turbine can sense at least approximately 5 percent grid voltage, right?” (Vol. 2B Tr. 44:1-3) (Supp. App. 16). He replied, “That’s correct.” (*Id.* at 44:4) (Supp. App. 16). GE brandishes this as proof that Erdman is an LVRT patent. (GE Br. 25). But as Professor Harley’s repeated responses make clear, Erdman requires 5% voltage *as measured inside the turbine*, not at the fault. (Vol. 1B Tr. 111:9-20, 112:7-10) (Supp. App. 5-6).

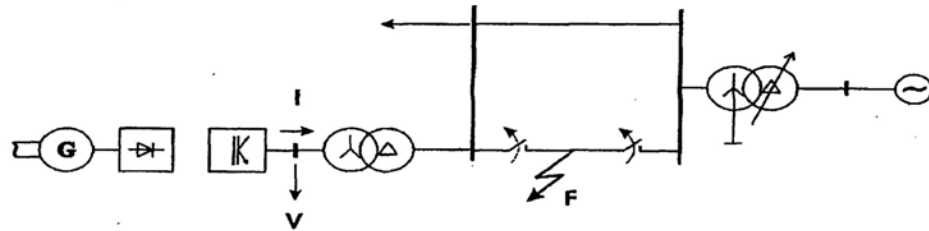
With 5% voltage within the turbine, but the fault just outside, Erdman satisfies any limitations in the '705 patent. GE complains that the 5% voltage Erdman detects would not permit him to synchronize with the grid. (GE Br. 26). However, when grid voltage disappears during a zero voltage fault, no electrical machine can synchronize with the grid. Just like the electrical machine in the '705 patent, Erdman rides through zero voltage events by continuing to deliver current as if the fault never happened. *Compare* DTX 1199 at [0013] (App. 633) (“[E]lectrical current is delivered to a utility grid during a fault condition at a level that is substantially the same as pre-fault conditions.”), *with* DTX 1509 at 10:59-62 (App. 884) (“These values facilitate PLL phase angle signal being driven to a phase angle value that would be in effect if there was no grid disturbance.”). Indeed, in one embodiment of the '705 patent, voltage is measured inside the turbine, just as in Erdman. (DTX 1509 at 4:34-40) (App. 881). There is really no difference between them.

As already discussed, every single witness has agreed that impedances between the fault and the turbine will result in measurable voltage inside a wind turbine during a zero voltage event outside the turbine. *See* Vol. 1B Tr. 111:9-18, Vol. 2B Tr. 94:23-95:4 (Supp. App. 5, 18-19) (Harley); Vol. 6B Tr. 20:16-21:5 (Supp. App. 46-47) (Grady); Vol. 4 Tr. 30:10-21 (App. 252) (Larsen); Vol. 6A Tr. 24:2-15 (App. 361) (Lyons). Despite this residual voltage, Erdman is riding-through a zero volt fault. The Patent Office agreed, concluding that “[b]oth the machine and the control system remain connected to the grid during a voltage event, which includes an approximately zero voltage event.” (DTX 2785 at 11) (App. 1253).

In sum, Erdman is not a 5% voltage patent, but rather deals with zero voltage events in the collection system and elsewhere. The 5% voltage to which Erdman refers is a function of impedances between the fault and the measurement location, and does not distinguish it from the '705 patent.

2. Wobben

Like Erdman, Wobben discloses riding through zero volts at the high-side of the padmount transformer. Figure 5, reproduced below, illustrates the Wobben ride-through configuration:



(DTX 1201 at 9:14-15, Fig. 5) (App. 658). As the diagram shows, a “zero impedance” fault “F” was applied on the high-side of the padmount transformer (the left set of interlocking circles) and *before* the substation transformer connecting the wind farm to the utility grid (the right set of interlocking circles). Harley explained that because the “fault is reasonably close to the pad-mount transformer,” Wobben represents a “pretty severe test” of ride-through capability. (Vol. 1B Tr. 119:17-120:16) (App. 48-49). In fact, Wobben discloses precisely the same ride-through capability as claimed in the '705 patent.

Surprisingly, GE submits that Professor Harley “agreed” that Wobben does not teach zero voltage ride-through. (GE Br. 27). But Professor Harley did no such thing. Rather, he agreed that the Wobben controller would not sense zero volts “at the turbine”

during a zero voltage event. (Vol. 2B Tr. 72:3-6) (Supp. App. 17). The Wobben controller measures voltage on the generator-side of the padmount transformer at the location indicated by a “V” on Figure 5. (Vol. 1B Tr. 121:14-23) (App. 50). Harley’s testimony was merely an expression of the accepted scientific principle, already discussed in the context of Erdman, that due to the impedance of the padmount transformer, one would expect to measure voltage at this inside location. (Vol. 1B Tr. 121:23-122:13) (App. 50-51).

In its brief and at trial, GE points to Wobben’s reference to “symmetrical three-phase faults with residual terminal voltages of .1 . . . 8 pu.” But, as Mitsubishi has already explained at length, *see* Mitsubishi Br. 38-39, this passage relates to German regulatory requirements “for models of wind power installations.” (DTX 1201 at 6:24-25) (App. 655). German network operators required wind turbines connecting to the network to complete simulations of turbine responsiveness to different voltage conditions “for various system analysis purposes.” (*Id.* at 6:26-33) (App. 655). The terminal voltages described represent test parameters applied in those simulations. They say nothing whatsoever about Wobben’s ability to do zero voltage ride-through, and certainly do not contradict Wobben’s express disclosure of ZVRT capability elsewhere in the patent.

GE also maintains that none of the figures in Wobben illustrate a voltage drop down to zero volts “at the turbine.” (GE Br. 28). But, as already described, Figures 8 and 9 of Wobben show the electrical machine remaining connected when the voltage measured inside the turbine hovers close to zero. (DTX 1201 figs. 8-9) (App. 673-674).

Again, the fact that the figures do not show voltage dropping all the way to zero is a function of where Wobben measures. (Vol. 1B Tr. 121:14-122:13)(App. 50-51).

Finally, GE submits that Wobben is not a ZVRT patent because it refers to delivering 20% active power during the fault. (GE Br. 29). Contrary to GE's assertions, this amount of active power, measured inside the turbine, does not mean that Wobben is an LVRT patent. Wobben explains that, during fault conditions, this power may be dissipated by a so-called "chopper" to prevent overspeeding of the rotor. (DTX 1201 at 13:4-6) (App. 662). Further, impedances between the fault and the turbine ensure that there will be residual terminal voltage of approximately 5 to 7% inside the turbine during a zero voltage event. (Vol. 1B Tr. 121:14-122:1) (App. 50-51). This is voltage enough to produce power at the recorded levels *inside* the turbine. Nowhere does Wobben say that active power will pass through the fault, or be delivered to the grid, during a zero voltage event, as GE suggests.

The PTO has rejected Claims 1 and 7 of the '705 patent as being anticipated by Wobben. (DTX 2785 at 17-18) (App. 1262-1263). GE asks the Court to conclude that the PTO erred in its construction of both Wobben and the '705 patent. For the reasons described herein, no such conclusion is warranted.

3. Nielsen

Mitsubishi has already explained why, in this inequitable conduct trial, the initial embodiment of Nielsen remains material. In Figure 1, the electrical machine remains connected through the rotor windings, and they remain available to deliver active power to the grid whenever the grid can receive it. (DTX 1212 at 4:14-18) (App. 735). GE argues that under the "broadest reasonable construction" test, the entire machine,

including the stator, must remain connected, but fails to identify language requiring that result. Mitsubishi's interpretation is, at least, reasonable, and therefore grounds enough for materiality. In fact, the PTO has ruled that connection through the rotor is enough to satisfy the claim language:

After the generator is demagnetized, the stator is disconnected from the grid, but the rotor continues to supply power to the grid. . . . As such, it seems clear that at least a portion of the electrical machine remains connected to the grid for voltages on the grid that are very low . . . even zero, as discussed in Nielsen.

(Office Action in *Ex Parte* Reexamination, dated December 18, 2012, at 5) (Supp. App. 182). Applying the broadest reasonable construction standard, this Court should also find that Nielsen is material based on the first embodiment alone.

Even accepting GE's claim construction, however, the second and third embodiments, depicted in Figures 2 and 3, are material to the '705 patent. Professor Harley meticulously demonstrated at trial that, in these configurations, both the rotor and the stator remain connected. (Vol. 2A Tr. 30:5-34:5) (App. 68-72). GE does not contest this basic engineering point.

Rather, GE argues that Professor Harley's opinion "lacks credibility" because he did not advance it earlier in this litigation. (GE Br. 31). However, Dr. Harley explained at trial that he did not opine on the second and third embodiments previously for the simple reason that he believed that connection through the rotor, reflected in the first embodiment, was sufficient. (Vol. 2B Tr. 6:8-7:4) (Supp. App. 14-15). The Court's July 9, 2012 Order Denying Defendants' Motion for Judgment as a Matter of Law changed that assumption. (Dkt. 640 at 9). But at the time that Order issued, Professor Harley was

on a lengthy vacation in his home country of South Africa.⁴ By the time he returned and turned to this case again, this Court had ordered written witness testimony to be submitted 14 days in advance of trial. (Dkt. 642). Professor Harley therefore began working on his written testimony. His opinions regarding the alternative embodiments were incorporated therein, rather than into a supplemental report. This was an innocent oversight, and is not a basis for disregarding the substance of Nielsen. GE – which had the written testimony two weeks before trial – has not claimed prejudice.

On the merits, GE argues that one configuration described in Figure 2 is not material because it is being used only for disconnection and reconnection to the grid. (GE Br. 32). GE cites a single sentence of the written description providing that this configuration “can be used during disconnection from the grid and/or during reconnection from the grid.” (DTX 1212 at 6:8-9) (App. 737). Here, GE loses the forest for the trees.

Figure 2 is quite plainly a diagram showing multiple configurations of impedances that facilitate ride-through during grid faults. (DTX 1212 at 2:19-23, 30-32) (App. 733). The configuration at issue is one in which impedances are placed in series with the stator windings to dissipate energy generated by the turbine during a fault down to zero volts. (*Id.* at 5:26-29) (App. 736). During normal operation, the impedances are not part of the circuit. When a fault on the grid is detected, one end of the stator windings is momentarily opened to allow the impedances to be placed in the circuit. The circuit – with both the stator windings and the impedances incorporated – is then closed to allow

⁴ On June 8, 2012, Professor Harley left his hometown of Atlanta for a nearly six week vacation in South Africa, which ended on July 18. From July 22 to 28, Harley was in San Diego for a conference. From August 15 to 17, he was in Denver.

the impedances to do their work of dissipating excess energy. (*Id.* at 6:4-8) (App. 737). When the fault clears, one end of the stator windings is again momentarily opened to permit the impedances to be removed. However, at all times throughout the ride-through process, at least one end of the stator – the other end – remains connected. Thus, the patent does not say that the stator is disconnected and no such inference can be drawn.

Finally, GE argues that the configuration in Figure 3 is not being used during ZVRT because the specification expressly refers to the delivery of active power. (GE Br. 33) (quoting DTX 1212 at 6:14-17) (App. 737). But, as described in the context of Wobben, due to impedances, there may be active power inside the turbine during a zero voltage event, just not at the location of the fault. Figure 3 merely describes a configuration in which active power is ready to be delivered to the grid, if the grid is able to accept it.

In sum, even accepting GE's erroneous construction of the scope of the '705 patent, Nielsen is material.

4. Saylor's Presentation

To avoid acknowledging its materiality, GE focuses on the wrong part of Steven Saylor's October 2003 presentation on the achievement of zero voltage ride-through at Horn's Reef. A table in the presentation, reproduced below, very explicitly shows in its last row that the modified V80 turbine at Horns Reefs would remain connected during zero voltage events for up to 200 milliseconds:

V80-1.8MW VRCC**(Robust Design)**

Voltage	Parameter Value	Parameter Value (Sec.)
High	110 to 120 %	5
	120 to 125 %	2
	125 to 130 %	0.800
	Greater than 130%	Instantaneous Trip
Low	90 to 80%	10
	80 to 75%	2
	75 to 50 %	0.800
	0 to 50%	0.200

(DTX 1063 at 9). GE does not even address this table in its brief.

GE argues that the Saylor's presentation is not material because it describes a solution involving disconnection of the stator. (GE Br. 34). In a slide entitled “Advanced Grid Option 3,” Saylor's refers to “disconnection of the stator” and “reconnection after 3 s.” (DTX 1063 at 13) (App. 595). But Advanced Grid Option 3 is quite clearly *not the solution that was implemented at Horns Reef*. The same slide shows that the Advanced Grid Option 3 was applied to a different kind of machine – 2.0 MW as opposed to 1.8 MW – and that the machines with Advanced Grid Option 3 were first delivered in April 2003, as opposed to late 2002 when the wind turbines at Horns Reef were commissioned. (*Id.*) (App. 595).

Thus, Saylor's is material because it describes the achievement of ZVRT for 200 ms at Horns Reef in late 2002. The discussion of disconnection of the stator refers to a different version of the V-80.

5. Bolik Paper

According to GE, the Bolik papers are immaterial because, like Saylor's, they describe a ZVRT solution involving disconnection of the stator. (GE Br. 35). But, as already explained, where Dr. Bolik refers to disconnection of the stator, she is quite explicitly discussing the ride-through method of an *earlier* turbine model, the Vestas V66. (DTX 1208 at 5)(App. 712) (“In Figure 6 a simulated example for the control

algorithm *implemented in a V66 turbine* is shown. After an occurrence of an error in the grid . . . the following steps are performed: 1. The stator of the generator is disconnected from the grid”) (emphasis added). Indeed, Nick Miller, GE’s own employee and an attendee of Bolik’s conference in Denmark in 2003, admitted that the solution described by Bolik did not rely on disconnection of the stator. (Vol. 5A Tr. 14:2-15:5) (App. 276-277).

GE claims that Figure 7 shows disconnection of the stator. But that figure refers to a different model of the V-80 than was installed at Horns Reef. The Horns Reef V-80 was a 1.8 MW machine, not a 2.0 MW machine. (DTX 1208 at 5) (App. 712). As Bolik explains, the 1.8 MW V-80 installed at Horns Reef remained connected for up to 200 milliseconds of zero voltage. (*Id.*).

6. Bolik Presentation

GE argues that the Bolik presentation is immaterial because it describes two alternative ride-through methods – a hardware solution and a solution involving disconnection of the stator – neither of which is within the scope of the ‘705 patent. (GE Br. 36). Once again, GE is seeking to score victories with semantics rather than substance. The Bolik presentation uses the words “extra hardware” when describing disadvantages of an impedance-based solution to ZVRT. (DTX 1209 at 14) (App. 728). But the “extra hardware” required to implement an impedance-based approach is not the type of heavy hardware, external to the wind turbine –i.e., capacitor banks – that GE has argued would be outside the scope of the ‘705 patent. *See* Vol. 2A Tr. 99:6-16 (defining the hardware solution as a “capacitor solution”) (Supp. App. 9.1). Indeed, Nick Miller has conceded that the Horns Reef solution was control-based rather than hardware-based.

(Vol. 5A Tr. 14:13-15:3) (App. 276-277). The Bolik presentation was clearly material because it described a control-based solution that achieved ZVRT for 200 milliseconds and did not involve disconnection of the stator.

7. Prior Public Uses at Colorado Green and Sweetwater

Mitsubishi's opening brief demonstrated that GE, too, was able to meet the shorter duration requirements of the grid codes beginning in 2003. GE does not deny that the key GE players (1) helped develop and successfully test GE's own turbine equipment for short duration ZVRT; (2) approved or were aware of the full scale production and commercial sale of wind turbines using this ZVRT-capable equipment; and (3) later used the new equipment and successful ZVRT test results to market and publicize their achievement. Faced with this incontrovertible evidence, GE is forced to manufacture a *post hoc* criticism of its own ZVRT tests and speculate about one of the post-production software settings. Both arguments are contradicted by elementary engineering principles and their own documents and testimony.

Key GE players provided testimony proving that GE's turbines could perform ZVRT in severe pre-production testing conducted in June 2003. *See* Mitsubishi Br. 62-68. GE's equipment operated "flawlessly" during and after zero volt faults applied on the high side of the padmount transformer. DTX-1214 at GENDTX03964701 (App. 764).

In fact, not one individual at GE ever expressed any concern about the severity of the tests before this trial. But now that GE will no longer benefit from its early achievement, GE claims that the tests were somehow flawed because the report only appears to show results at the "optimal condition of full load." GE Br. 38. GE conflates "optimal conditions" for *generating power* with "optimal conditions" for *performing ride through*. *See* Vol. 6A Tr. at 54:3 – 14 (Grady) (Supp. App. 41). Certainly, full wind

conditions are optimal for generating power. *Id.* at 54:5-6 (Supp. App. 41). But they are the *most difficult* for ride through, since the turbine must deal with the greatest difference between the power coming out of the generator and the zero volt situation on the grid. Vol. 2A Tr. 39:6 – 40:9 (Harley) (App. 73-74). It is undeniable that the most power is coming out of the generator during *full load*, not partial load. *Id.*

The logic of Dr. Harley's testimony is confirmed by the contemporaneous statements of the key GE players. Larsen himself suggested the day before the pre-production tests that full load (i.e. the high speed of 1550 rpm) would be the most severe test for ZVRT:

Fault cases should include the ***worst possible faults*** from the highest possible initial operating point. Key points are ***high speed (1550rpm), high output (1.7MW if you can do it), high reactive output, high terminal voltage (e.g. at least 105% on 575v).***

DTX-1579 at GENDTX00118629 (App. 905). This is precisely how GE proceeded to test for ZVRT the next day:

Even more severe three phase Low Voltage Ride Through tests were performed on the ETU (Engineering Test Unit) on June 20, 2003. These are the most severe faults, with a complete short circuit, down to zero volts at the transformer primary . . . The AccuWave [later named GEIS] converter has passed all of these tests, operating flawlessly during and after the faults. ***The most severe case is show here, which is 1550 RPM and 0.9 overexcited.***

DTX-1214 at GENDTX03964701 (App. 764). There is absolutely no support in the contemporaneous documents for the proposition that *lower* blade speed and power output, i.e. partial load, would be a more severe test.

GE's own actions show that it had confidence in its tests. Based on those tests, GE promptly approved the full-scale production of turbines with the exact same

equipment. DTX-1213; DTX-2720; Vol. 5A Tr. 81:17 – 83:8 (App. 746-747; App. 1242; App. 322-324). As Mitsubishi noted in its opening brief (at 63-64), GE proceeded to tout its achievement. For example, a September 2003 copyrighted release stated: “Employing the GE Industrial Systems converter, the GE 1.5MW, 60 Hz wind turbine can ride through system faults that result in down to 0% grid voltage for a duration of 100 milliseconds.” DTX-164 (App. 482). GE was still using the June 2003 test results to show off its ZVRT capability to customers in January 2007. *See* Mitsubishi Brief 64. GE’s post-trial brief does not even attempt to refute these real-world markers of its early success.

Because it is so plainly evident that GE’s turbines were capable of ZVRT, GE tries to suggest that no disclosure to the PTO was necessary because one of the turbine’s post-production software settings (Parameter 20.19) did not allow for ZVRT. In particular, GE suggests that the turbines would “disconnect if the grid voltage *at the turbine* dropped below 5%” because Parameter 20.19 was set to 5 percent. GE Br. 37 (emphasis added). Again, GE plays a game with words, failing to distinguish between the voltage *inside* the turbine, which will never drop below 5%, even in a fault situation, and the grid voltage *outside* the turbine, which could well drop to zero or approximately zero and thereby fulfill the conditions for the '705 patent. *See* Mitsubishi Br. 66-67.

As Dr. Harley explained at trial, Parameter 20.19 is based on a measurement of voltage on the generator side of the padmount transformer, i.e. *inside the turbine*. Vol. 2B Tr. 83:23 – 84:9 (App. 101.1-101.2). This measurement is taken by the turbine’s multi-function relay, the base reading for which is 575 volts. *Id.*; *see also* DTX-1227 at GENDTX00176031. Parameter 20.19 *must* be measuring voltage inside the turbine

because voltage outside the turbine – on the high-side of the padmount transformer – would be thousands of volts higher. *See, e.g.*, PTX-6.0009 (Supp. App. 195) (showing the low level voltage at 690V and the medium level voltage at 10,000V); and PTX116.00010, Figure 2.3-1 (Supp. App. 196) (showing the low level voltage at 690V and the medium level voltage at 22,000V).

Thus, the turbines at Colorado Green and Sweetwater were measuring voltage *inside the turbine* and would remain connected through a zero volt fault *outside the turbine*. GE persists with its fuzzy terminology of “at the turbine” throughout its brief because the truth is that the 5 percent setting allows the turbines to ride through zero volt faults outside the turbine. Even in GE’s own certification test applying a severe fault on the high side of the padmount transformer, Parameter 20.19 would still measure at least 5 percent voltage due to impedance. *See* PTX-6.00152, Figure 3.26.1 (Supp. App. 205).

In 2005, Miller even published a technical paper which used the turbines at Colorado Green as a model for riding through zero volt faults and remaining connected to the grid. DTX-163 0(App. 908-914); Vol. 5A Tr. 8:25-9:3 (App. 270-271). GE tries to cast doubt on the Miller paper by suggesting that he believed the simulation “did not reflect the actual capabilities of the wind turbines at Colorado Green.” GE Br. 59. Miller’s current assertions plainly do not match the tone of the paper itself, which expressed no such contemporaneous concerns or qualifications. The paper rather stated that “for the situation modeled, the simplified equivalent representation is *sufficiently representative of the detailed wind farm system.*” DTX-1630 at GENDTX00408387 (App. 911).

Thus, GE installed for public use turbines that were capable of riding through a zero fault on the electric power system. Though the duration of these faults was shorter and this technology was less advanced than the equipment GE later devised, it fell within the broad terms of the '705 patent. The older technology was not disclosed. Had it been, GE might have been forced to narrow its patent – and it would not have covered the supposedly infringing Mitsubishi turbines that also did ZVRT for a shorter duration.

8. Prior Public Uses at Cowboy Wind Farm

Similarly, the key GE players did not reveal their early development of a sophisticated PLL state machine. Both at trial and in the opening brief, Mitsubishi meticulously showed how GE's 2003 diagram reflected a PLL state machine – one that dynamically changed to different states in response to changes on the grid. Mitsubishi Br. 70 – 71. GE does not disagree with any of that detail.

Instead, GE predicates its argument on the assumption that Claims 9 and 13 require the exact four-state PLL state machine described in the exemplary embodiment of the patent. Throughout its questioning at trial and its brief, GE improperly narrowed all of its questions to whether *the* exemplary PLL state machine— the one developed by Barker in 2005— was being used at Cowboy Wind. *See* Vol. 3B Tr. 96:25-97:6 (Supp. App. 30-31) (asking whether Barker believed that “GE’s 1.5 megawatt wind turbines installed in April of 2005 included *the* PLL state machine”) (emphasis added); GE Br. 42 (“The wind turbines at Cowboy Wind, which were installed in April 2005, did not have *the* PLL state machine”) (emphasis added). Of course, this was the wrong question.

As Mitsubishi explained in its opening brief, GE first achieved LVRT and ZVRT with a three-state PLL state machine. *See* Mitsubishi Br. 70-73.⁵ The plain language of the '705 patent states that the "PLL state machine" includes "any number of states" that facilitates the ride-through operation of the wind turbine. DTX-1509 (App. 873-887). It is ironic that GE incorrectly criticizes Mitsubishi for failing to cite to the '705 patent when it is GE that refuses to engage with the language of the patent. GE fails to address the broad language of the claims (referring only to a PLL state machine) or the express language of the specification (accepting "any number of states"). The claimed invention is not limited to the preferred embodiments or specific examples in the specification. *See Falana v. Kent State Univ.*, 669 F.3d at 1355. And it is certainly not so limited when, as here, the specification expressly recognizes the possibility of alternative technologies.

GE falls back to Barker's unsupported assertion that technology used at Cowboy Wind "lacks some of the sophistication of the state machine and the advantage of it." Vol. 3B Tr. 98:14-16. Even if this were true, it would not be legally significant. As long as the prior use fell within the scope of claim language, it should have been disclosed.

II. Clear and Convincing Evidence Shows Deceptive Intent

The next question is whether the five GE players intentionally withheld from the Examiner the material prior art. Of course they did. In its post-trial brief, GE makes no effort to refute the record evidence showing: (a) GE Wind had a sophisticated system – staffed with scores of engineers around the world – to monitor the technology of its major competitors; (b) the key GE players learned about not one or two, but multiple pieces of

⁵ As explained in his testimony, Professor Harley looked at computer code for Cowboy Wind and concluded it showed a state machine. His testimony is uncontradicted on this point. Dr. Grady admitted he could not read computer code.

material prior art through this monitoring system; and (c) the key GE players discussed and analyzed the prior art on multiple occasions.

Nor does GE dispute what happened next. The key GE players did not disclose *any* of this prior art to the Examiner – either in the application filed on October 20, 2006 or over the next three years of the patent prosecution. The *only* ride through technology disclosed to the patent office was Janssen '188, a GE patent application filed in January 2003 that covered low voltage events only down to 15%. The key GE players withheld from the Examiner how the field had advanced after Janssen and thereby gave the false impression that they were the first in the industry to achieve zero voltage ride through. The patent issued on that basis alone.

GE attempts to defend this conduct by relying upon the same communications that are the subject to Mitsubishi's pending privilege motion. *See* Dkt. 723, 735. Specifically, GE claims that, in the communications between GE engineers and their lawyers, they did not discuss this prior art or its materiality but rather only discussed Janssen '188. *See, e.g.*, GE Br. 43-46. But GE withheld from Mitsubishi all of the underlying documents reflecting these lines of communication. As the Court will recall, the Court gave GE the choice in pretrial discovery either to stand on the privilege or produce the underlying documents. GE's decision to selectively waive the privilege at trial while still withholding the documents is improper, unfair, and prohibited by case law. *See* Dkt. 723, 735.

A. The Key GE Players Knew The Prior Art Was Material

Mitsubishi's brief recapped the evidence showing that the key GE players had the prior art in their files, talked about and analyzed it, and exchanged the prior art multiple

times before and during the prosecution of the '705 patent. (Dkt. 744 at 52-84). GE's response largely *ignores* this evidence.

GE argues that "Mitsubishi failed to establish that McGinness reviewed any of the prior art he is alleged to have" deliberately withheld. *See* GE Br. 43, 45 (Dkt. 747). On the contrary, Mitsubishi showed not only that he reviewed key pieces of prior art but that he sent emails giving his analysis of them. For example, in May 2006 – only a few months before the filing of the '705 patent application – McGinness highlighted Erdman on an excel sheet describing Clipper IP and emailed the excel sheet, along with a copy of Erdman itself, to others at GE. *See* Mitsubishi Br. 53, 78 (Dkt. 744). In October 2007, McGinness sent another copy of Erdman to GE engineers and lawyers. *See id.* Critically, McGinness did not simply forward the prior art to others at GE but he supposedly gave legal advice and opinions in those emails. (Vol. 3B Tr. 9:24-10:13; PTX 503.0216) (App. 194-195; Supp. App. 425). This was the basis for GE's decision to withhold those emails from Mitsubishi in discovery. *See, e.g.*, PTX-503 at 216 (privilege log entry 3494) (Supp. App. 425) (GE withholds the McGinness cover email, saying it contains confidential communications "reflecting legal advice from GE's legal department record patent advice and strategy related to wind turbine technology").

Mitsubishi also showed that McGinness received by email multiple copies of the prior art from GE engineers, as well as spreadsheets describing the claims in competitor wind patents. *See* Mitsubishi Br. 78-80 (Dkt. 744). GE claims that McGinness did not review the prior art identified by the engineers and got involved only if the engineers raised a potential infringement problem for GE. *See* GE Br. 43, 45. But GE withheld from Mitsubishi the cover emails for these particular communications because the

engineers allegedly sought legal advice in them. McGinness testified that he worked closely with patent engineers in analyzing the claims of GE's competitor patents, and he urged his colleagues to review monthly and weekly reports on new wind energy patents. (Vol. 3A, Tr. 37-40, 58-59) (Supp. App.23-26, App. 134-135). The patent engineers provided their work product to him for that purpose. (Vol. 3A, Tr. 38-40, 57-58, 60; DTX-1492 at ¶ 6) (Supp. App. 24-26; App. 133-134, 136; Supp. App. 165-171). If McGinness *was not* involved in providing analysis for these particular pieces of prior art, there would not be a basis for the privilege claim over these communications.

Furthermore, the record is clear that McGinness, Miller, Frame, and Delmerico – as part of the Grid Interconnect IP team – pored over the IP of GE competitors in the specific area of grid interconnection during the three months leading up to the '705 patent application. *See* Mitsubishi Br. 51 (Dkt. 744); *see also* Vol. 3A, Tr. 68 (App. 144). On September 5, 2006, they completed an initial summary of 12 key Vestas grid connect patents, including Nielsen '936. (DTX-276; DTX-2669) (App. 489-506; 1478-1536). On September 27, 2006, the team completed a summary of 27 key Enercon grid connect patents, including Wobben '936. (DTX-1715) (App. 915-942). McGinness had already highlighted 3 key grid connect patents for Clipper Wind, including the Erdman '083 patent, earlier that summer. (DTX-2569; Vol. 3B Tr. 9:23) (App. 1105-1127, 194). Then, on October 18, 2006, Grid Interconnect IP team held a “Grid connect – IP work out” to review the results of their several-month review – *just two days before the '705 patent application was filed*. (DTX-2562) (App. 1445-1477).⁶

⁶ GE withheld on privilege grounds all of the contemporaneous communications between the Grid Interconnect IP team members. Mitsubishi learned about the team's work on competitor IP only because GE engineer Aaron Barr forwarded the spreadsheets to Scott Frame in November 2007. Mr. Barr advised Scott Frame that GE intended to

GE claims that the team's spreadsheets and discussions were limited to evaluating possible infringement. *See* GE Br. 44. GE's own documents, however, flatly contradict this claim. The express purpose of the Grid Interconnect IP team was to "develop additional IP in the areas of utility grid issues with wind plants" and specifically "to review existing patents, find gaps in IP coverage and develop a strategy in developing new IP concepts." DTX-1904. Moreover, McGinness later synthesized the results of the Grid Interconnect IP team's work as part of his licensing responsibilities. As part of a 2007 licensing presentation, McGinness included a graph with circles for each of the key competitors whose grid connect technology was reviewed, including ones for what appear to be the same 27 Enercon patents, 13 Vestas patents, and 3 Clipper patents that were reviewed by the members of the Grid Connect IP team in the summer of 2006. (DTX-56 at GENDTX07657094) (App. 475).

Of course, even if the team's purpose had been limited to avoiding competitor prior art, the key GE players would still have had a duty to disclose the prior art to the Examiner. A patent applicant cannot pretend that information learned in one context is irrelevant in another just because of where it was discovered. The PTO rules create a duty of participants "to disclose ... all material information ... regardless of the source or of how they became aware of the information." MPEP § 2001.06 (2006). "Materiality

conduct another landscaping project in Salem, Virginia similar to the grid interconnect IP project and asked Frame for the names of others to invite. *See* DTX-2669. Mitsubishi was then able to match these spreadsheets up to earlier drafts in the possession of the key GE players on the grid interconnect IP team even though the related cover emails were withheld. *See, e.g.*, DTX-276, DTX-1715. GE argues (Br. 56) that Frame never read the attachments to Mr. Barr's November 2007 email but GE ignores Frame's involvement in the original team's work product.

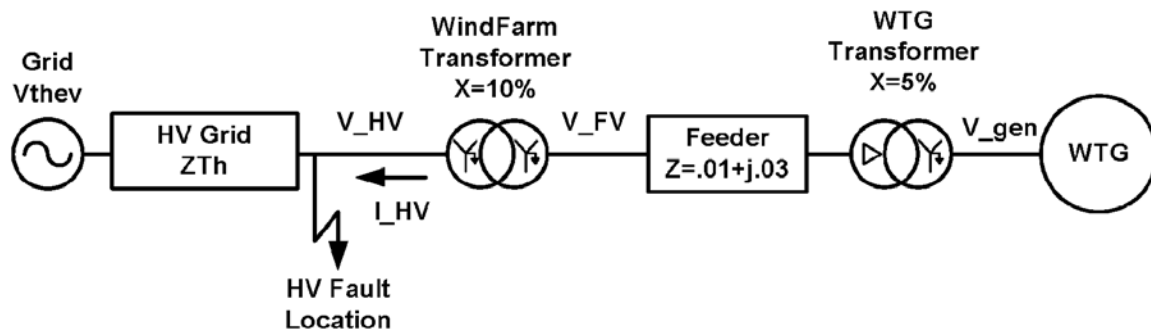
controls whether information must be disclosed ... not the circumstances under which or the source from which the information is obtained.” *Id.*

GE claims that, even if McGinness had reviewed the prior art references, he did not appreciate their materiality because he is not skilled in the relevant art. *See* GE Br. 45. However, McGinness testified that he “certainly” was aware of LVRT technology in 2006. (Vol. 3A, Tr. 76) (App. 152). He had some understanding of technology claimed in the '705 patent application and consulted with technical experts to help understand what he did not. (Vol. 3A, Tr. 75) (App. 151). In fact, it was McGinness who made the decision with outside counsel to disclose the 15% LVRT Janssen '188 patent. (Vol. 3A, Tr. 65) (App. 141). In doing so, McGinness confirmed that he is sufficiently qualified to appreciate the materiality of the prior art relating to low and zero voltage ride through.

The materiality of the prior art was not obscure, but explicit in the patent applications and articles. The prior art referred explicitly to zero volt faults. It is GE’s *post hoc* rationalizations about how the art actually discloses LVRT that are obscure and do not appear on the face of the patent. GE relies on distinctions that do not appear in the contemporaneous documents. For example, GE has not pointed to a single contemporaneous document stating that Erdman and Wobben did not achieve zero voltage ride through because of the amount of voltage measured in the turbine or that Nielsen was irrelevant because only the rotor was connected.

On the other hand, the key players were familiar with a contemporaneous document illustrating concepts of the '705 patent that ran parallel to the prior art. In both trials, the GE witnesses testified about the “Concept” document entitled “Converter Control Concepts to Meet Severe Grid Requirements with GE 1.5 MW Wind Turbine

Generators.” (PTX-11; *see also* DTX-2684 and DTX-2629). *See* First Trial Transcript (Mar. 1 AM) Tr. 100:24-105:19; First Trial Transcript (Feb. 29 AM) Tr. 108:3-116:23; Inequitable Conduct Transcript, Vol. 4 Tr. 24:19-30:9 (Larsen) (discussing the Concept document, marked as DTX-2684). That document contained a diagram of the system model:



Note:

- All impedances in pu on WTG MW base

(*Id.* at Fig. 5-1). The diagram makes two points clear. The fault can be applied outside of two transformers – it is not limited to the base of the turbine. And the transformer at the turbine alone caused 5% impedance, thereby creating at least 5% voltage in the turbine during a zero fault. These are, of course, assumptions that make prior art such as Erdman and Wobben highly material.

This Concept document, co-authored by Larsen, was so important that it was sent by McGinness to outside patent counsel on May 31, 2006. (DTX-1315, privilege log entry 5443 (App. 821). Larsen, Miller and Frame were copied on that email. *Id.*; *see also* Dkt. 430 at 5 (Special Master order explaining that privilege log entry nos. 4689 and 4691 – Supp. App. 425.1 – are email chains from McGinness circulating the draft patent

application materials and invention disclosure form, along with the Concept technical document). They testified at trial that they understood its basic concepts. The key GE players knew the prior art was material because of what the prior art said and what their own Concept document confirmed.

B. The Sheer Number of Material Omissions Is Evidence of Intent to Deceive

As Mitsubishi explained, the sheer number of material omissions is surprising in relation to other cases and supports an inference of deceptive intent here. In *Aventis*, the district court found that the omission of two material references reveals a course of conduct and reinforced its conclusion that the applicants acted with deceptive intent. *See Aventis*, 743 F. Supp. 2d at 354. Here, Mitsubishi has presented proof of at least eight material omissions – each of which would be sufficient to invalidate the claims.

Contrary to GE’s assertions, there is nothing “circular” about this argument. *See* GE Br. 46. The Federal Circuit has repeatedly recognized that a strategy of deception may be inferred from multiple material omissions. *See Ferring B.V. v. Barr Labs, Inc.*, 437 F.3d 1181, 1194 (Fed. Cir. 2006) (affirming summary judgment of inequitable conduct because “there was not a single omission. Rather, there were multiple omissions over a long period of time – a fact that heightens the seriousness of the conduct.”); *Refac International Ltd. v. Lotus Development Corp.*, 81 F.3d 1570, 1580, 1582 (Fed. Cir. 1996) (finding additional omissions, even if they do not themselves constitute inequitable conduct, can heighten the effect of the omission at issue); *Agfa Corp. v. Creo Products*, 451 F.3d 1366, 1379 (Fed. Cir. 2006). These cases do not rely upon the “should have known” standard, cited by GE. (GE Br. 42).

Therasense does not alter this precedent. Although the Federal Circuit modified the legal standard for inequitable conduct in some respects, it simultaneously affirmed the long-standing principle that intent may be inferred from indirect and circumstantial evidence, so long as that inference is the single most reasonable one to draw from the facts and shows a deliberate decision to withhold or misrepresent known material information. *See Mitsubishi Br. 75* (Dkt. 744). The number of omissions is circumstantial evidence of the applicant's knowledge and deliberate decision. *See Mark Indus, v. Mobile Scaffolding Mgmt. & Sales, Inc.* No. 87-06193, 1989 U.S. Dist. LEXIS 16267, *46 (C.D. Cal. Sep. 14, 1989) ("While the making of a single material misrepresentation or the withholding of a single piece of material information may alone suffice to establish inequitable conduct, a pattern of such actions or omissions clearly argues against honest mistake and provides strong support for a ruling of inequitable conduct."). There has never been a case with so many material omissions as this one.

C. The Prior Art Is More Material Than Janssen '188

Moreover, the omitted prior art is more material than what the GE players cited to the Examiner. *See Mitsubishi Br. 85-86*. GE suggests that the other prior art would have been cumulative of Janssen '188. *See GE Br. 48*. However, Janssen '188 did not purport to cover voltage drops down to approximately zero – at any location – and did not include a PLL regulator. Here, the omitted prior art referred directly to zero volt faults and, in the case of Erdman, used a PLL regulator. Since the prior art was more material, and the prior art was not disclosed but Janssen was, there is a compelling inference that GE players deliberately decided not to disclose the omitted prior art.

D. The Failure to Correct Misrepresentations is Further Proof of Deceptive Intent

As Mitsubishi explained, the key GE players should have disclosed the prior art from the start, but at least definitely should have disclosed the prior art during the three years of the pendency of the patent application. *See* Mitsubishi Br. 86-87; *see also* *Nov Nordisk A/S v. Carasco Pharm. Labs.*, 775 F. Supp. 2d 985, 1024 (E.D. Mich. 2011) (finding inequitable conduct in part based on the applicant's failure to bring the omitted prior art to the Examiner's attention during the patent prosecution). GE's only response is that McGinness was not as involved when the '705 application was amended in 2009. *See* GE Br. 48-49.

However, McGinness was certainly not out of picture in 2007, when he sent and received the prior art multiple times. *See* Mitsubishi Br. 53, 78-79 (Dkt. 744). GE does not dispute that the duty of candor extends throughout the entire prosecution of the patent application. *See* 37 C.F.R. 1.56; Vol. 5B, Tr. 34. Indeed, the Manual of Patent Examining Procedure makes several references to the importance of the timely filing of material information. Section 609 states that the relevant rules "are designed to encourage individuals to submit information to the Office promptly." Section 2004 commands: "Submit information promptly. An applicant, attorney, or agent who is aware of prior art or other information and its significance should submit same early in prosecution, e.g., before the first action by the examiner, and not wait until after allowance. Potentially material information discovered late in the prosecution should be *immediately* submitted." MPEP § 2004.12.

The rules are not optional. As McGinness acknowledged, he was the attorney of record and thus his duty of candor continued even if he had delegated day-to-day responsibility to another attorney. (Vol. 3A, Tr. 34:20-22).

E. There Is A Pattern of Misconduct

Mitsubishi explained that McGinness engaged in a systematic pattern of nondisclosure in his dealings with the PTO. This systematic pattern includes the deliberate removal of the E.ON curve before the filing of GE's '221 patent application, the withholding of GE's own Weng application in the '705 application, and the omission of the ZVRT references in the '705 application. *See* Mitsubishi Br. 88-92.

GE argues that the '221 patent is not in any way related to the '705 patent. *See* GE Br. 49. But both were “standard-essential patents” covering technologies that must be used to comply with an industry requirement. Both were filed to anticipate U.S. grid code requirements. Both aimed to monopolize the wind turbine industry by choking off competitors with respect to the technology for interconnecting to the grid. Both failed to disclose material prior art. And both were invalidated when the PTO was made aware of the undisclosed prior art. *See* Vol. 5B Tr. 56:9-57:8 (App. 355-56); *see also* DTX-1176 (Supp. App. 55-153). The '221 patent is not unrelated to the '705 patent, but rather its predecessor. These events show that GE has been seeking to lure the PTO into granting invalid standard-essential patents since it entered the wind turbine industry in 2002.

GE says that the E.ON reference was in the prosecution file for the '221 patent. *See* GE Br. 50. However, as Mitsubishi's expert explained, the E.ON reference was in the German application, in German, and would not have been read by the U.S. patent examiner. Vol. 5B, Tr. 55:6-19 (App. 354). The German application was included only for purposes of showing the date of application – not for its substance. *Id.* GE's key players – all savvy in the U.S. patent process – knew that the source of the figure, and its prominence in the European wind industry, would slide across the examiner's desk unnoticed.

GE argues that there was no evidence McGinness knew about Weng. *See* GE Br. 50. To the contrary, he authorized the filing of the *Weng* application with the patent office. *See* Mitsubishi Br. 91 (citing DTX-2622 at GENDTX07696708-714) (Supp. App. 174.14 – 174.20).

F. GE Did Nothing to Rehabilitate the Credibility of the Key Players

Mitsubishi pointed out that this Court was entitled to evaluate – and discount – the credibility of GE’s witnesses based on the nature of their explanations. *See* Mitsubishi Br. 92-93. Mitsubishi pointed to specific contradictions and unexplained failures in the testimony of GE witnesses. *See id.* at 93-97. They remain uncured.

1. James McGinness

GE’s post-trial brief has done nothing to reconcile the inconsistencies in McGinness’ testimony. McGinness acknowledged at trial that he made a deliberate decision as to the scope of the cited references, but he did not include any of the references discussed here because “no one ever suggested to him that any of the art at issue in this case might be material to the '705 patent.” GE Br. 45. McGinness made several failed attempts to support this supposed explanation, and GE repeats them in its post-trial brief.

First, McGinness tried to suggest that no one ever completed a prior art search for the '705 patent. *See, e.g.*, Vol. 3A Tr. 48:14 - 53:22 (App. 124-29). McGinness’ story was directly contradicted by Scott Frame who was “confident” a prior art search was done prior to the filing of the '705 patent application. *See* Mitsubishi Br. 95 (citing Vol. 5A Tr. 70:15-21) (App. 311).

Second, McGinness tried to blame the patent office for missing the prior art, claiming that “a patentee is generally under no duty to perform a prior art search.” GE Br. 51. However, the Court heard testimony at trial that a patentee does have such a duty when it is aware of industry developments suggesting that the technology is not novel. Vol. 5B, Tr. 32-33 (App. 334-35). As Mitsubishi explained, deceptive intent can be inferred when an applicant avoids uncovering material information, despite clear warnings of its existence. *See* Mitsubishi Br. 84. GE’s brief does not mention, much less confront, this point.

Third, McGinness tried to blame his “highly skilled” engineers for failing to notify him. Yet, McGinness had to admit that he and the entire Grid Interconnect IP group analyzed the competitor art, at the very least for purposes of ensuring that GE’s own products did not infringe the competitor patents. (Vol. 3A, Tr. 59:2-9) (App. 135); *see also* DTX-1904(App. 980-981) (stating purpose of team was to “find gaps in IP coverage and develop a strategy in developing new IP concepts”). If GE had an innovation regarding ZVRT, the Grid Interconnect IP group necessarily analyzed and reached a conclusion as to whether it was precluded by the Clipper, Enercon, and Vestas patents for which detailed descriptions had been furnished. Thus, McGinness didn’t need a search or a reminder from his engineers. He just needed to disclose of information with which he was already familiar.

Finally, GE’s brief does not even attempt to clear up McGinness’ unexplained failure to cite the disputed prior art references in connection with the original application, which had no limitation to zero voltage drops. *See* Mitsubishi Br. 93. Even under GE’s

characterization of the prior art references at issue, they would have been relevant to the original claims.

GE is left with the naked argument that McGinness does not need offer any good faith explanation for his conduct unless and until the accused infringer has met its burden. *See* GE Br. 56. But in this case, McGinness *has* offered an explanation – one that is not credible. Non-credible testimony given at trial plainly has independent evidentiary value. *See Advanced Magnetic Closures v. Rome Fastener Corp*, 607 F.3d 817, 830 (Fed. Cir. 2010) (district court did not error in finding deceptive intent where the inventor offered “evasive, argumentative, and at times contradictory testimony”); *Brasseler USA I, L.P. v. Stryker Sales Corp.*, 267 F.3d 1370, 1384 (Fed. Cir. 2001) (evasive testimony of prosecuting attorney is probative of intent to deceive). *See also Therasense*, 649 F.3d at 1291 (“The absence of a good faith explanation for withholding a material reference does not, *by itself*, prove intent to deceive.”) (emphasis added).

2. Nick Miller

Miller did not provide a credible excuse for the failure to disclose competitor prior art even though he and other key GE players knew it was material to the '705 application. As explained in its opening brief, Mitsubishi established at trial that Miller understood that at least one of GE’s competitors had achieved a “controls-based solution . . . [f]or ZVRT . . . [i]n which the turbine will always remain connected to the grid.” Vol. 5A Tr. 14:17-15:5 (App. 276-277); Mitsubishi Br. 56-57. Miller promptly communicated his understanding to key GE players, including '705 co-inventor Einar Larsen. *See* DTX-2297 (App. 1042) (emailing that it “[l]ooks like 0% for 200ms on V80”).

Miller and others on the Grid Interconnect IP team later reviewed and analyzed not only the Vestas prior art, but also prior art from Enercon and Clipper. There is absolutely no contemporaneous evidence that any of the key GE players distinguished this prior art from GE's ZVRT technology on the basis that the references did not go down to zero. Instead, the evidence shows that the key GE players understood that, because of impedance, the GE turbines could ride through zero volt faults on the grid. *See, e.g.*, Vol. 5A Tr. 8:25 – 9:3 (App. 270-271); DTX-1630 (Miller paper) (App. 908-914).

GE argues that Miller did not believe that the prior art worked all the way down to zero. GE Br. 58 (citing PTX-478). In the cited email, Miller says that Vestas' technology "corresponds roughly, but not exactly to our LVRT III" because "they *seem to claim that they can do zero*, but are sketchy on the details." PTX-478 (emphasis added). As Mitsubishi explained, prior art references are presumed to be enabling. *See Mitsubishi Br. 95-96*. GE's brief ignores this dispositive teaching. Miller's subjective belief about whether or not the solution disclosed actually worked has no bearing on whether or not the prior art anticipated the claims of the '705 application. *See In re Antor Media Corp.*, 689 F.3d 1282, 1287-88 (Fed. Cir. 2012) ("In patent prosecution the examiner is entitled to reject application claims as anticipated by a prior art patent without conducting an inquiry into whether or not that patent is enabled . . ."). Miller had an undeniable duty to disclose the prior art, but deliberately chose not to do so.⁷

⁷ In a footnote, GE advocates a sliding scale of intent based on an individual's level of involvement with the application. GE cites no law and, of course, there is no basis in the law for the proposition. Miller was substantively involved with and even reviewed drafts of the '705 application. *Mitsubishi Br. 6*. As such, his deliberate decision to withhold material prior art forms the basis for inequitable conduct.

Miller also understood the turbines at Colorado Green were able to perform ZVRT. First, Miller was aware of the ZVRT capabilities of the GEIS converters from his work on potential wind projects in Australia. He wrote to GE's potential customer an assurance that "[t]he GE 1.5 megawatt machine equipped to satisfy the Australia NEC code requiring operation through extremely low (zero voltages) will continue operation down to zero voltage without tripping from the grid." DTX-2814 (App. 1312-1313); Vol. 5A Tr. 33:6-13 (App. 292); *see also* DTX-1995 (Miller received emails from Larsen and his boss Art Romano confirming the capability of the GEIS converter to achieve ZVRT). Miller later showed off the capabilities of the Colorado Green turbines in a technical paper that he admitted at trial included a simulation demonstrating ZVRT. Vol. 5A Tr. 8:25 – 9:3 (App. 270-271); DTX-1630 (App. 908-914). The paper confirmed that the simulation was "sufficiently representative of the detailed wind farm system." *Id.* at GENDTX00408387 (App. 911).

GE now suggests that Miller somehow had knowledge that the GE turbines had a setting that required them to trip at grid voltage below 5 percent. First, GE adduced no evidence at trial to support that Miller knew anything about Parameter 20.19. There simply is no factual basis for this argument. Second, GE turbines still achieved ZVRT even if with a 5 percent minimum setting as explained previously.

3. Einar Larsen

Mitsubishi showed that Larsen was integrally involved in the 2003 ZVRT tests. The day before the test Larsen directed the GE team to "include the worst possible faults" and further advised that they should "be as low as you can go – if you can claim zero voltage at high side of padmount transformer then you will be untouchable." DTX-

1579(App. 905); Vol. 4 Tr. 5:7 – 6:16 (App. 234-235). Larsen understood that the test converter was the design “deployed across all the turbines” including in those at Colorado Green and Sweetwater. Vol. 4: 16:6 – 17:1 (App. 241-242).

GE offers a familiar excuse for Larsen’s failure to disclose these prior uses – that Parameter 20.19 was set to 5 percent in the field. As with Miller, GE’s excuse fails because it is based on the fundamental technological error that turbines with a 5 percent setting could not ride through zero voltage events. Larsen admitted at trial that GE’s turbines would still see voltage of at least 5 percent for zero voltage faults outside of the turbine because of impedance. Vol. 4 Tr. 20:11-25; 30:10-21 (App. 245-250, 252). During GE’s own certification of its turbines, the measurement inside the turbine recorded at least 5 percent voltage when the fault was applied on the high side of padmount transformer where bus 242 would be. PTX-6 at 152 (Supp. App. 205), Diagram 3.26.1.1 (showing the measurement going down no lower than 5 percent without even including a 0 on the y-axis). Larsen’s own “Converter Control Concepts” document further supports this principle. DTX-2684 at 15 (App. 1226) (showing impedance of 5 percent at the padmount transformer). This is the same document that GE contended in the first trial first summarized the concepts that formed the basis for the '705 patent. *See* First Trial Transcript (Feb. 29 AM), Tr. 108:3-14.

Finally, Larsen knew that the Colorado Green turbines in particular could perform ZVRT. In September 2003, Frame, Miller and Larsen considered whether using GEIS converters would expose GE to any risk of failing to meet the interconnection requirements for Colorado Green. *See* DTX-1573 (App. 895). The analysis found that the GEIS converter would meet the interconnection requirements and expressly noted

that “[c]onverter/generator ride through with voltage drops as low as zero volts at grid side of padmount transformer have been tested with continuous operations.” *Id.* at 5.

4. Scott Frame

As Mitsubishi explained in its brief, Frame not only played an integral role in the application process for the '705 patent, but also oversaw the 2003 ZVRT tests and the subsequent commercial production of the technology. *See* Mitsubishi Br. 7. Frame also served on the Grid Interconnect IP team while it analyzed material prior art. *Id.* GE’s primary excuse for Frame’s failure to disclose the prior art and public uses is that “it doesn’t take much” for the discussion of ZVRT to “surpass his technical capability.” GE Br. 57. It is astonishing that GE would suggest that one of its top power converter engineers, who oversaw the testing and then production of millions of dollars of converter equipment, might not have had sufficient capacity to understand ride through technology of GE and its competitors.

GE also suggests that Frame did not believe earlier uses of the GEIS converter were sufficient to implicate the claims of the '705 patent. The emails on which GE relies, however, do not suggest that GE’s turbines were not *capable* of meeting the ZVRT requirements. Instead, they merely demonstrate that, as of 2004, GE Wind was not yet guaranteeing the effectiveness of the technology in its contracts. *See* PTX-505 (Supp. App. 426) (“Zero voltage is an additional option that is being developed per request of the PPB. Zero voltage ride through will not be available for FP&L in 2004.”) Indeed, there was no need for such guarantee in 2004 for GE’s US customers because ZVRT was not yet an official FERC requirement. The first of GE’s US projects that actually *required* ZVRT was Kaheawa Pastures. DTX-2155 (Supp. App. 172). Thus, while GE

did not initially guarantee ZVRT capability, the evidence shows that GE was providing ZVRT as described by the claims of the '705 patent since at least the end of 2003 as part of its ride-through package for a number of customers, including PPM (at the Colorado Green wind farm) and Babcock & Brown (at the Sweetwater I wind farm).

5. Robert Delmerico

GE's only excuse for Delmerico's failure to disclose is that he was not substantively involved with the '705 application. Most notably, GE totally ignores Mitsubishi's proof that Delmerico was a member of both the ZVRT Program team and the Grid Interconnect IP team. Mitsubishi proved at trial that these teams were involved with both the development of ZVRT and the review of competitor ride-through technology. Mitsubishi Br. 5. Thus, Delmerico testified falsely when he claimed that "he was not involved in the design effort to develop zero voltage ride through capability [for] GE" or that "he had no discussions about intellectual property with respect to zero voltage ride through." GE Br. 62. With respect to the large number of Delmerico's privileged communications, Mitsubishi is not requesting a negative inference merely from their existence, but rather when viewed in the context of Delmerico's undisputed involvement on the ZVRT Program and Grid Interconnect IP teams.

GE does not dispute that Delmerico identified Wobben '941 as "relevant and of concern" in a July 2005 email. DTX-1960 (App. 982). GE's brief relies upon McGinness' testimony that Delmerico's comment was in relation to a concern about GE's own products. *See* GE Br. 64. Yet, GE also says that McGinness was not a recipient of this Delmerico email and that no one ever raised this concern to him. *See* GE Br. 45 n.14. GE fails to explain this internal inconsistency. In any event, even if

Delmerico's comment was in relation to a concern to GE's own products, this explanation merely confirms that Delmerico and others at GE knew of Wobben '941's materiality to GE's technology.

G. The Key Players Had A Motive To Withhold The Prior Art

GE did nothing to refute the fact that the key players had a compelling motive to withhold known material prior art and public uses from the PTO in hopes of pushing through an overly broad ZVRT patent. GE could not dispute that they were all well-versed in both their competitors' ride-through technology and the development of ZVRT requirements. *Mitsubishi Br.* 50-52. Nor could GE dispute that McGinness set the '705 patent application in motion a mere six days after FERC issued the first ZVRT requirements in the United States. DTX-2691 (App. 1238-1239); Vol. 3B Tr. 47:11 – 49:11 (App. 214-216). He plainly understood that GE could attempt to block its competitors from the United States wind turbine market if it obtained a patent broad enough to cover all controls-based solutions to the new federal ZVRT requirement.

The '705 application went far beyond any patentable invention GE might have made in late 2005. And the expansive scope of the claim language was no simple mistake or oversight. Contemporaneous documents show that the key players intended to obtain an overly broad patent that covered all types of solutions for riding through all types of zero volt faults. *See, e.g.*, DTX-1778 (App. 964) (“Key question is regarding scope of claims for ZVRT vs. general grid faults.”); DTX-2195 (App. 1029-1030) (“Zero voltage ride through technology specifically needs to be patented . . . even the concepts we don’t pursue.”). The only way to do this was by withholding (with one exception) every single prior art reference related to ride-through. GE now seeks to inject narrower

language into the patent, such as a requirement that the turbine be “blind” and unable to “sync” to the grid, in hopes of distinguishing known material prior art. The only problem is that there is absolutely no basis for this in the patent because of the key players’ deliberate decision to draft it so broadly.

CONCLUSION

GE seeks to enforce a patent whose key claims the PTO has already declared invalid. The patent was obtained by falsely representing the state of the art. The doctrine of inequitable conduct protects the patent system in moments precisely like this one. This Court should hold that GE obtained the '705 patent by inequitable conduct and that its claims are therefore unenforceable. In light of this holding, the order issued on July 9, 2012 granting partial judgment (Dkt. 640) should be vacated, and judgment should be entered for the defendants.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing reply brief has been served via the Court's ECF system on all known counsel of record in accordance with the Federal Rules of Civil Procedure on this 10th day of January, 2013.

By: /s/ Alice E. Loughran
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